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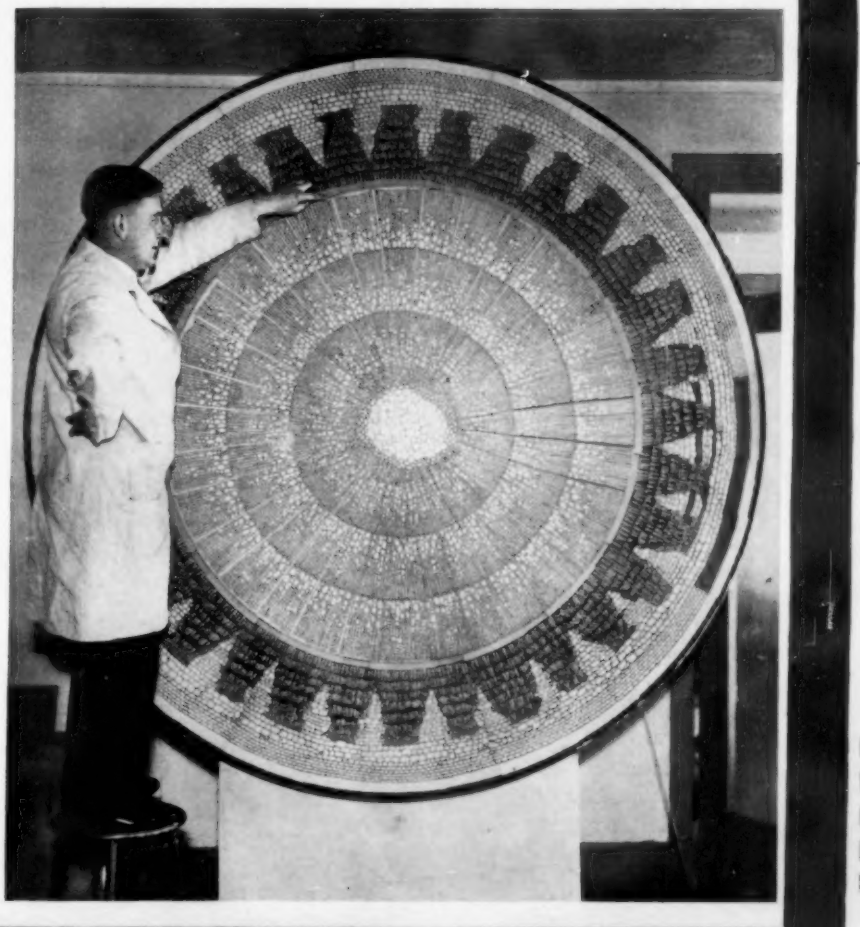
SCIENCE REVIEW OF THE YEAR

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



DECEMBER 24, 1932

A Year's Growth in 75 Seconds

See Page 398

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SCIENCE NEWS LETTER

VOL. XXII *No. 611*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

Two new forms of copper are sheets as thin as paper and an alloy that looks like gold.

A platinum nugget weighing over thirteen pounds has been found in the Ural Mountains.

A psychologist reports that the hand with which a person throws a ball is a better test of left-handedness than tasks and activities, such as writing.

A new kind of thermometer has been made to check the temperature of grain in bins as deep as 40 feet, so that dangers of heating can be averted.

Vaccination protects against smallpox for about seven to ten years, physicians find; and persons successfully vaccinated twice are usually immune for life.

Checking up on the potency of rattlesnake venom, a scientist kept some venom in a dry state for 23 years and found it still as dangerous as when fresh.

Monkeys are not pestered by fleas.

Vegetables which have been "quick-frozen" cook in about half the time needed for fresh vegetables.

Even hogs shouldn't be allowed to make "hogs" of themselves, for experiments show that moderate feeding is more profitable in terms of pork sales.

The ancestor of the modern pineapple was a runty, sour little fruit no bigger than a hen's egg, that grew in Brazil and was valued for the fiber of its leaves.

Unemployed workers in England volunteered to help scientists excavate and restore an old Roman road, the men receiving transportation and a small food allowance.

The Director of the National Park Service declares that if the desert vegetation peculiar to the New World is not to be entirely wiped out, a desert national park or national monument should be established without delay.

BOTANY

Twig's Growth Shown by Huge Automatic Model

See Front Cover

VISITORS at the science exhibits of the Century of Progress Exposition in Chicago next year will have an opportunity to see in a minute and a quarter how the twig of a tree puts on a year's growth. A huge model, seven and a quarter feet in diameter, is now being constructed to represent an enlarged cross-section of a basswood or linden twig a quarter of an inch through. It will be so arranged that when a motor drive is started it will increase its diameter an additional eighteen inches, adding wood on the inside of the growing zone and bark on its outside, in the most realistic manner.

Every microscopic detail of the three-year-old twig is represented. Each cell of the three annual rings of the wood, with its central pith and the radiating pith-rays, is outlined. At the outside, between wood and bark, is the cambium or growth layer. It is here that the main action takes place when the motor is started. Outside the cambium is the complex structure usually lumped as "bark," but detailed here into phloem or food-conducting strands, parenchyma or rind and the true bark. The choice of basswood as the twig to be represented is an especially happy one, because that is the species studied by practically every beginning botany student.

The "growth" of the model is accomplished by means of a series of sliding plates and moving canvasses, which bear the outlines of the new, expanding cells. Each sliding plate is driven by a special worm gear; coarse-pitched gears for the outside "bark" growth, finer-pitched for the inside wood growth. The canvas is wound on rollers, and its unwinding simulates the twig's growth in diameter. When the motor is started the fourth year's "growth" is completed in 75 seconds; then the twig is automatically returned to its three-year condition, ready for the next "show."

Science News Letter, December 24, 1932

GENERAL SCIENCE

Achievements in 1932

Science Strides Ahead, Even in Depression Year, to Explore Atoms, Conquer Disease, Launch the Largest Ship

IMPORTANT advances were made in every field of science during 1932.

Ten outstanding groups of science achievements may be listed:

1. Discovery of the neutron, extensive research on cosmic rays and successful attacks on the atomic nucleus.

2. Imminent development of vaccines protective against yellow and typhus fevers, and evidence that virus diseases are caused by non-living chemicals that attach to living matter.

3. Demonstration that tooth decay is caused by inadequate calcium, phosphorus and vitamin D and further discoveries of the nature of vitamins.

4. Continued discovery of hormones, including prolactin, an anterior pituitary principle controlling milk secretion, and a hormone useful in determining sex before birth.

5. Discovery of treasure tombs at Monte Alban, Mexico, exploration of an unknown Mayan city and continued archaeological unearthing of ancient civilizations in the Old World.

6. Increasing evidence for the antiquity of man on the North American continent and new discoveries of ancient man in Eurasia and Africa.

7. The total eclipse of the sun on Aug. 31 and the discovery of the asteroid or minor planet that comes closest to earth.

8. Launching of the world's largest ship, the Normandie, and the completion of the Soviet power plant, the Dneprostroy.

9. Research in Arctic meteorology and geophysics was stimulated by the inauguration of the Second Polar Year.

10. Psychological testing methods found increasing industrial use under the stimulus of economic conditions and employment techniques.

Among the many important advances in science during 1932 were:

Aeronautics

Prof. Auguste Piccard, accompanied by Max Cosyns, broke his own altitude record of last year and established a new world record when he reached a height of 53,153 feet (16,201 meters).

The world's longest range photograph, covering the greatest amount of earth's surface at a single exposure, was taken of Mt. Shasta 331.2 miles distant from an elevation of 23,000 feet by Capt. A. W. Stevens.

Progress has been made in the development of blind flying, including a method which enables a ship to fly, without following a guiding radio beam, on a straight line course from any direction toward a transmitter and to correct continuously for wind drift.

A small, fixed auxiliary airfoil ahead of the main wing was designed to reduce the landing speeds of high-speed airplanes.

A world record was won for France when Bossoutrot and Rossi flew 6,587 miles (10,601 km.) in a closed circuit.

Horsepower of four-stroke-cycle airplane engines can be increased 18 per cent. by using a fuel injection system and overlapping the timing of the inlet and exhaust valves to completely clear the cylinder of exhaust gases, the National Advisory Committee for Aeronautics found.

The world's land plane speed record of eight years' standing was broken by James H. Doolittle when he averaged 294.38 miles (473.82 kilometers) per hour for four laps over a three kilometer course.

A new rotor control for the autogiro, which tilts the plane of rotation of the blades, was developed in England.

Three new feminine records were set up in the United States for Class C airplanes: Mrs. May Haizlip reached a speed of 252.226 miles per hour; Mrs. Amelia Earhart Putnam flew 2,447.8 miles without stopping and Mrs. Louise Thaden and Mrs. Frances Marsalis remained in the air 196 hours and five minutes with refueling.

Designed as sister ship to the world's largest airship Akron, the Macon, with a gas capacity of 6,500,000 cubic feet, neared completion at the Akron air dock.

A new instrument, the V-G recorder, was designed by the National Advisory Committee for Aeronautics to measure directly loads imposed upon a plane by airflow during flight.

The greatest height to which an airplane has been flown, 43,976.245 feet (13,404 meters), was reached by Capt. Cyril Frank Uwins in England.

The speed of military bombers was increased to a rate greater than that of pursuit-type airplanes of two years ago and the normal cruising speed of large commercial transports was increased 20 to 40 per cent.

A U. S. Navy balloon piloted by Lieut.-Comdr. T. G. W. Settle and Lieut. Wilfred Bushnell traveled 921 miles from Basle, Switzerland, to win the 1932 James Gordon Bennett Cup Race from a field of 16.

Anthropology and Archaeology

A treasure tomb, containing remains of six Mixtec warriors and an array of ornaments in gold, silver, and other materials, beautifully fashioned, was discovered at Monte Alban, Mexico, by Alfonso Caso, of the Mexico City National Museum.

Discovery of Calakmul, a ruined city of enormous area in Yucatan, containing more sculptured monuments than any Mayan city previously explored, was announced by the Carnegie Institution of Washington.

A skeleton of a young woman found in Minnesota was identified by Dr. A. E. Jenks, University of Minnesota, as a primitive American more akin to Eskimo than Indian, who lived probably 18,000 to 20,000 years ago.

Discovery of a Folsom type dart point associated with fossil bison in a quarry near Scott's Bluff, Nebraska, was reported by C. B. Schultz, University of Nebraska.

A dart point of the Folsom type, associated with the bones of extinct animals of the pleistocene period, was found in a cave near Carlsbad, N. M., by E. B. Howard of the University of Pennsylvania Museum. (*Turn Page*)

SAFER BECAUSE IT LANDS SLOWER

An airplane equipped with auxiliary airfoil ahead of main wing, which was developed by research of the National Advisory Committee for Aeronautics to reduce landing speed

A burned Pueblo pit house, excavated by L. L. Hargrave of the Museum of Northern Arizona, was dated 784 A.D. by the tree-ring dating method, and thus took rank as the oldest dated house in the United States.

The biggest Mexican pyramid, at Cholula, contains still older structures within it, a Mexican government archaeologist discovered.

Little known regions of Ecuador and Colombia were explored by the Latin-American Expedition, Inc., and studies of Jivaro and Aguaruna Indians were made.

A Brooklyn Museum expedition excavated burial mounds of ancient Indians of the Amazon Delta, and studied isolated modern tribes of Brazil.

A series of isolated and almost inaccessible rock-island fortresses was discovered on Kodiak Island, Alaska, by Dr. Ales Hrdlicka, U. S. National Museum.

An extra pre-sacral vertebra was found in 16 per cent. of males and less than one per cent of females among 200 Eskimo skeletons examined by Dr. T. D. Stewart, Smithsonian Institution.

Progress in tracing the ancestry of the Plains Indians was reported by Dr. W. D. Strong of the Bureau of American Ethnology, who excavated three layers of cultural remains on a mesa at Signal Butte, Nebraska.

Three thigh bones belonging to men of the Pithecanthropus erectus type were found at Trinil by Dr. Eugene Du Bois, confirming the existence of this type as a true zoological genus.

Fossilized skeletal remains of a new race, discovered in Algeria, were studied at the Institute of Human Paleontology, Paris, and thought to be an important link between early man in Europe and South Africa.

Homo soloensis, represented by a primitive human skull and fragments of another, was discovered in Java by W. F. F. Oppenoorth and C. ter Haar; thus adding to a series suggesting that Java has been inhabited since at least the middle of the Ice Age.

Remains of ten Neandertal men were discovered near Mount Carmel by the joint expedition of the American School of Prehistoric Research and the British School of Archaeology.

Bones of a woman and child who lived in the time of Neandertal Man were found in a mountain cave in Hungary by Dr. Ottokar Kadics, chief state geologist.

The skull of the "ancient lady of Lloyd's" was pronounced Mousterian in age, and the oldest known being of the species Homo sapiens, by Prof. G. Elliot Smith.

A cave containing an "art gallery" of engravings and fine polychromes of the Magdalenian period was discovered by Norbert Casteret, French archaeologist.

A Viking Age settlement was unearthed at Ballinderry, in the course of the five-year study of Irish civilization by Harvard University.

A series of burials, showing changes in cultures from the sixth to the eleventh century A.D., was excavated near the Baltic city of Memel, by Dr. Carl Engel of Konigsberg.

Continuing excavations at the ancient Agora of Athens for the American School of Classical Studies at Athens, Dr. T. Leslie Shear found evidence confirming the identification of important buildings in the Athenian public square.

Soviet scientists explored the ruins of a submerged Greek city (*Turn to Page* 402)

GEOLOGY

Geological Work Threatened By Pending Cut in Funds

SERIOUS curtailments of important research work of the U. S. Geological Survey are threatened in the Department of the Interior appropriation bill for the fiscal year ending June 30, 1934, reported in the House of Representatives.

The appropriations committee eliminated completely the items for "fundamental research, geologic science" for which the budget estimated $46,470 and the "investigation of mineral resources in Alaska" for which the budget estimate was $60,180. In all, the committee-recommended appropriations for the U. S. Geological Survey are $457,400 less than the budget estimates of $2,384,900.

Blow to Geology

If the appropriations for fundamental geologic research are not restored, the progress of geology in this country will be dealt a severe blow. The federal Geological Survey is the nation's principal research agency in geology, cooperating with universities and a few mining and oil companies which provide the only other organizations supporting geological science.

The lack of appropriations for the Alaskan explorations would bring to an abrupt end the pioneer service under frontier conditions that was begun more than 30 years ago. Less than half of Alaska has been covered by the topographic and geologic maps necessary for utilization of its resources.

Volcanologic Surveys Remain

Volcanologic surveys, largely in Hawaii, remain in the bill with $12,500, which is $2,500 less than the appropriations for 1933 and $6,010 less than the budget's recommendations.

The other cuts in the nearly half million dollars lopped off the budget's estimates for the U. S. Geological Survey reduce appropriations for topographic surveys by $62,000, geologic surveys by $35,700, stream gaging by $81,400, printing and engraving geologic maps by $64,170, investigations of minerals on public lands by $25,180, classification of lands by $72,950, general salaries by $3,340.

The whole Department of Interior bill recommends appropriations of $43,192,904 which is less than the budget estimates by $2,891,025. The only appropriations singled out for complete elimination in the whole bill are those for fundamental geological work and Alaska resources investigations of the U. S. Geological Survey.

Funds Transferred

Under the economy act passed by Congress last spring additional funds for the current year were transferred by the Secretary of the Interior to the geologic surveys, fundamental research, and the Alaskan researches. Actual funds available for geologic surveys and fundamental research combined were $500,000 in 1932 fiscal year, $419,750 in 1933 fiscal year compared with the $300,000 proposed for geologic surveys and nothing for fundamental research proposed in the House committee report, a reduction of 40 per cent. in two years. For the Alaskan work $69,000 is currently available, compared with nothing recommended.

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RADIO

The Science Service radio address next week will be on the subject

THE MENACE OF CANCER

by

Dr. Ellice McDonald

Director of Cancer Research at the University of Pennsylvania

FRIDAY, DEC. 30

at 12:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

AMERICAN ART

PUBLIC HEALTH

Nation's Health Good, Congress is Told

THE HEALTH of the people has continued generally good, in spite of economic depression and unemployment, Surgeon General Hugh S. Cumming declared in his annual report to Congress. He warned against making any predictions as to future effects of the depression on the nation's health.

A new low record for the tuberculosis death-rate was set and a low diphtheria death-rate was also recorded for 1931.

Scientific achievements of the research staff of the U. S. Public Health Service included discovery that cultures of plague germs could cause disease after being stored for nine years and that the causative virus of endemic typhus fever remained alive in rat fleas for 52 days. It is thought that fleas once infected remain infected throughout life, an important point since it is this insect that transmits the disease to man.

About one-fifth of all planes from tropical countries were found to bring mosquitoes with them. While there is danger of introducing yellow fever by airplane, the greater danger is the introduction of new species of insects.

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ARCHAEOLOGY

Most Important Mayan Pottery Jar Found in Burial Vault

THE MOST IMPORTANT piece of pottery ever found in the land of the Mayas, in Yucatan. This is the verdict of science on a tall cylindrical jar found in a burial vault inside a pyramid in the oldest known city of the Mayan Indians, Uaxactun.

On the jar is painted a scene of some great event in the ancient history of America. There is a man of importance, seated cross-legged on a dais; a figure back of him with an offering, a third back of that with a ceremonial staff. And before the throne stand two stiffly formal Indians in high plumed headdresses and robes of figured material. Ambassadors before a powerful Mayan chieftain? Perhaps.

What gives the scene its greatest scientific importance is the fact that the artist accompanied his picture with a date. Two vertical bands of little square pictures form the date in the curious hieroglyphs which the Mayas used as their writing system. Dr. Sylvanus Morley, of the Carnegie Institution's staff, reads this date as the equivalent in our calendar system of either 120 B.C. or 140 A.D. Scientists are not altogether agreed on the method of translating the Mayan signs, hence two possible readings, one of them two centuries later than the other.

First Complete Date

This very early date painted on a pottery jar is the first complete Mayan date ever found on any medium other than stone or stucco.

Considering that modern science cannot read all of the Mayan writing, it is remarkable that modern science can detect mistakes made by ancient Mayan writers. Yet Dr. Morley, a recognized authority on the Mayan hieroglyphs, found on examining the dated jar that there was something wrong with the symbols. It was as if the artist had carelessly written Sunday, December the first, 1932, whereas the first fell on Thursday. Several small corrections in placement of dots and bars are sufficient to make the date one that fits into the Mayan calendar of about 2,000 years ago.

The painted pottery in the burial vaults of Uaxactun is also important artistically. It shows how very early in their history these aboriginal Americans were capable of fine ceramic art, even judged by modern standards.

The vault containing the most important piece, the tall jar, was the resting place of a man. The skeleton lay at full length, with the hands folded toward the right shoulder. The beautiful jar held strange contents—the bones of over a hundred shrews. Lying about were other objects of real or symbolic value, including a jade bead, sea shells, a stingray tail, a turtle bone, a deer antler, and a carved bone necklace.

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GENERAL SCIENCE

Scientists Gather For Great Midwinter Meeting

ONE AND ONE-HALF million words of scientific discussion, enough to fill a bookshelf of respectable-sized volumes, will be precipitated in Atlantic City when the American Association for the Advancement of Science, together with something over forty of its affiliated societies, hold their midwinter meetings during the week after Christmas. Notices of presentation for approximately 1400 papers, which will average between 1000 and 1200 words apiece in length, have been received at the Washington headquarters of the Association.

This great flood of scientific information will be poured out before audiences totalling about 4000 persons, constituting only a little over a fifth of the total membership of the Association, which is now in the neighborhood of 19,000. The whole group will come together on several occasions in the vast Atlantic City auditorium, which is so huge that a full-sized football field can be laid out on its floor. But to facilitate discussion of most of the papers, the scientists will divide themselves into sectional and separate society meetings, comprising groups from a few dozen to several hundreds of persons.

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lost for 2,000 years under the Black Sea, and tentatively identified it as the famous Old Chersonesus.

A new pyramid at Giza was discovered by Prof. Selim Hassan, of the Egyptian University.

Evidence that South Africa provided ancient Egypt with manganese and other metals was presented by Prof. Raymond Dart, University of the Witwatersrand, who gives a new antiquity of 3000 B.C. to Rhodesian mines generally considered merely medieval.

The first "almost certain" portrait of one of the Hyksos, the Shepherd Kings who ruled Egypt, was found by Sir Flinders Petrie, at Tell el-Ajjul in Palestine; remains of five palaces, one on top of another, were explored.

An early Christian church containing art depicting Old and New Testament events was excavated in Dura, Syria, by Yale and the French Academy of Inscriptions.

Ruins of houses and palaces dating from 53 B.C. to the eighth century A.D. were explored at Ctesiphon by the Metropolitan Museum of Art and the Islamic Art Department of the German State Museums.

Art treasures rivaling those found at Ur were unearthed in a prehistoric Persian palace at Damghan by a joint expedition from the University of Pennsylvania Museum and the American Institute for Persian Art and Archaeology.

Ruins at Tepe Gawra, Mesopotamia, dating from about 3700 B.C. were explored and pronounced the "oldest known town in the world," with many architectural features heretofore supposed to have developed much latter; excavations were by University of Pennsylvania Museum, Dropsie College and, American Schools of Oriental Research.

The famous "ape-man" of Java, Pithecanthropus erectus, was really a woman, Dr. Ales Hrdlicka of the U. S. National Museum reported from a study of the brain cavity.

A hippodrome with a capacity of 80,000 persons was found at Antioch by an expedition of the Baltimore Museum of Art, the Musees Nationaux of Paris, the Worcester Art Museum and Princeton University.

Twelve thousand feet of motion picture film was the remarkable archaeological record obtained by the Oriental Institute from a flight over the Near East.

Evidence that Aegean cities 3,400 years ago had a common language was presented by Sir Arthur Evans.

Excavation at Ur, continued by the University of Pennsylvania Museum and the British Museum, yielded a seal of 2800 B.C. inscribed in writing of a kind used in Indus Valley, showing early spread of Indian civilization.

The first farmers in Germany raised wheat native to eastern Asia, Prof. Johannes Grüss, University of Berlin, reported.

Similarities betwen ancient picture writing of Mohenjo-Daro, India, and that of Egyptian sealings, proved an aid in interpreting the former, Sir Flinders Petrie reported.

Astronomy

Eros lost its distinction of being the heavenly body that approaches the earth closer than any other except the moon, as two closer asteroids were discovered, the Reinmuth object, discovered by Dr. Karl Reinmuth of Heidelberg, which is the closest, and Amor, discovered by Prof. E. Delporte of the Royal Belgium Observatory.

A total eclipse of the sun occurred on Aug. 31 in New England and Canada while clouds prevented observation by many astronomical parties inland and clear weather prevailed closer to the coast.

The first meeting of the International Astronomical Union to be held in America was held at Cambridge just after the total eclipse.

Radio tests during the eclipse indicated that both portions of the ionized Kennelly-Heaviside radio-reflecting layer of the upper atmosphere are caused by radiations from the sun traveling with the speed of light, not by corpuscles.

The sun may be only half the age now estimated for it if its energy comes from the conversion of hydrogen into heavier elements, Theodore Dunham, Jr., Mt. Wilson Observatory, theorized.

Spectrum photographs of meteors were obtained during the Leonid shower by Harvard College Observatory.

Many comets may be products of eruptions of the surface of Jupiter, Dr. S. Vsessviatsky, of Moscow, theorized.

Ammonia gas was detected in the atmosphere of Jupiter and methane was also detected on the four major planets by Dr. R. Wildt, Göttingen University.

Carbon dioxide is probably present in the atmosphere of Venus, although not previously found on any planet except the earth, Dr. Walter S. Adams, director, and Dr. Theodore Dunham, Mt. Wilson Observatory, reported.

Einstein's prediction of the curvature of light rays near the sun was corroborated by German eclipse photographs studied by Dr. Robert J. Trumpler, Lick Observatory.

Variable stars may vary in brightness because of electrical changes, R. W. Revans, British physicist, suggested.

Flecks of light bordering the Andromeda nebula were provisionally identified as star clusters by Dr. Edwin Hubble of Mt. Wilson Observatory.

The receding motion of distant nebulae does not decrease the velocity of the light which travels from them to the earth, Dr. Gustaf Strömberg, Mt. Wilson Observatory, found; his work was confirmed independently by Dr. George Van Biesbroeck, Yerkes Observatory.

Seven new comets and five returning periodic comets were sighted during the year.

The bicentennial of the birth of America's first astronomer, David Rittenhouse, was celebrated.

An age of the universe of not much more than 3,000 million years was estimated by Dr. Ernst J. Opik, Esthonian astronomer working at Harvard.

A new fireproof astrophotographic building at Harvard was opened to house 400,000 glass astronomical negatives.

Progress was made on the mirror and mechanical parts for the 40-inch telescope of the U. S. Naval Observatory.

An 80-inch reflecting telescope was planned for McDonald Observatory, Texas.

A 61-inch reflecting telescope, fourth largest in the world, was planned for the new Oak Ridge station of Harvard College Observatory.

A new apparent astronomical speed record was observed at the Mt. Wilson Observatory when two nebulae in the Gemini cluster were found to have a spectral red shift that indicates they are rushing away from earth at nearly 15,000 miles (24,000 km.) per second.

The Leonid and Perseid meteor showers were widely observed but the Leonids were not as plentiful as astronomers had hoped on the strength of a 33-year cycle based on the great showers of 1833 and 1866.

Clouds of gas or dust cause reddening of light passing through space and for this reason stars and clusters near the plane of the Milky Way are only a quarter to a half the distance previously estimated, it was found by Dr. Joel Stebbins, working with a photoelectric cell attached to the Mt. Wilson 100-inch telescope.

Biology

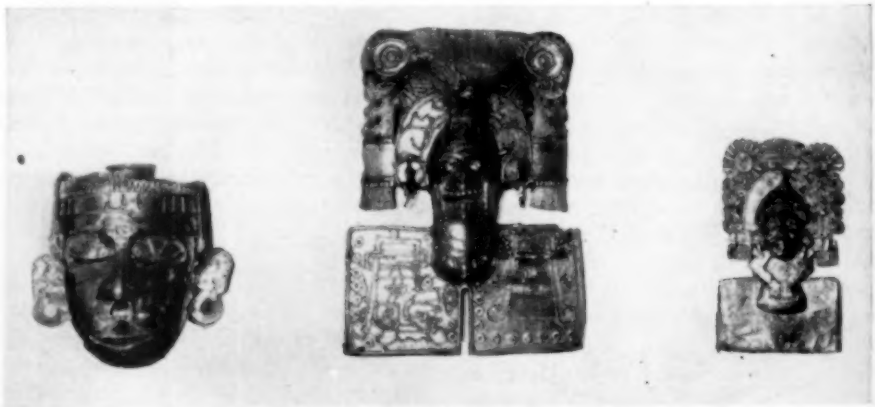
Neoplasm or "cancer" in fish was produced by the crossing of two neoplasm-free species by Prof. Myron Gordon, Cornell.

A nervous mechanism consisting of "neurohumor" secretions passing from cell to cell was reported by Dr. G. H. Parker, Harvard.

Bacteria in milk were killed by extremely high-pitched audible sound waves by Dr. Leslie A. Chambers and Prof. Newton Gaines, Texas Christian University.

Micro-motion pictures of germs show no life cycle with filtrable phase, Dr. Ralph W. G. Wyckoff, Rockefeller Institute for Medical Research, reported.

Filtrable viruses may be plastic and transparent forms of ordinary germs, rather than extremely small germs, Dr. Edward C. Rosenow of the Mayo Foundation suggested.



MONTE ALBAN BOOTY

Gold plaques, choice treasure from the year's most important archaeological discovery.

Bacteria were made to change to invisible form and back through regulation of the acidity of their food, Agnes Quirk, U. S. Department of Agriculture, reported.

A metamorphorsis from round form to rod is a regular part of the life cycle of certain germs, Alice C. Evans, U. S. Public Health Service, found.

Vaccines made from bacteria blown to bits by sudden release of carbon dioxide previously squeezed into them under pressure, were reported by David Crowther of New York.

The virus of mosaic disease can be killed by pulverizing the plant it infests, it was indicated by the Rockefeller Institute for Medical Research.

A method for measuring invisible germs through the use of filter and centrifuge and a formula giving the correlation decrease of concentration and size of particles centrifuged was developed by Prof. H. Bechhold and Dr. M. Schlesinger, Frankfurt Institute for Colloid Research, Germany.

"Centrioles," minute structures of the male reproductive cells formerly considered mere distortions of other substance, are definitely existing objects with important functions, Dr. H. Herbert Johnson of the College of the City of New York reported.

New varieties of cotton plants were produced by X-raying seeds, by Prof. W. R. Horlacher, Agricultural and Mechanical College of Texas, and D. T. Killough, Texas Agricultural Experiment Station.

X-rays can reverse the direction of evolution, Dr. N. W. Rimofeeff-Ressovsky found in experiments with fruit flies at the Kaiser-Wilhelm Institute for Brain Research in Berlin.

Rate of growth is an hereditary trait, Dr. A. M. Banta, Carnegie Institution of Washington, found.

The diameter of the gene, unit of heredity, was reported by Prof. Oswald Blackwood, University of Pittsburgh, to be 80 Angstrom units or 32 hundred-millionths of an inch.

Genes, the ultimate units of heredity, were seen and photographed for the first time, by Dr John Belling, Carnegie Institution of Washington.

The skeleton of an exceedingly primitive lemur was found in Germany by Prof. Johannes Weigelt, University of Halle.

The earliest known cat was among the fossils obtained from the Big Badlands of South Dakota for Princeton.

The Australian rat-kangaroo, believed extinct since 1843, was re-discovered by H. H. Finlayson of Adelaide University.

Riella, or "ruffle plant," one of the rarest species in the world, was rediscovered by Dr. R. A. Studhalter, Texas Technological College.

New plant varieties can be grown from sprouts off tumors, Dr. Dontcho Kostoff, Leningrad Academy of Sciences, and Dr. James Kendall, New York City College, found.

Cornstalks exclusively male, and others exclusively female, were bred by Prof. R. A. Emerson, Cornell University.

Parthenogenetic grasshoppers were produced at the University of Iowa by Eleanor H. Slifer and Dr. Robert L. King.

A female mule in South Africa, the property of W. J. Kilian, Weenan, Natal, was reported to have borne her second colt.

The python, though cold-blooded, becomes almost warm-blooded when incubating her eggs, found Dr. Francis G. Benedict, director of the Nutrition Laboratory of the Carnegie Institution of Washington, Boston.

The brain can oxidize alcohol as well as lactic acid, Dr. L. H. Nahum, Yale University, reported.

Maternal tissues prepare for nourishment of the embryo before the egg is attached, Dr. George L. Streeter, Carnegie Institution of Washington, found from a study of monkeys.

An outbreak of foot and mouth disease occurred in southern California, but was suppressed.

A biological research station was established at Bermuda, made possible by the Rockefeller Foundation and the governments of Great Britain and Bermuda.

Chemistry

Coronene, a new hydrocarbon, was synthesized by Profs. Roland Scholl and Kurt Meyer, of the Dresden Technical University.

Lignin was made artificially in the U. S. Forest Products Laboratory by the heating of cellulose at 135 degrees Centigrade.

Knowledge of the composition of lignin, next to cellulose one of the most important constituents of wood, has been advanced by the distillation experiments of Max Phillips of the Color Laboratory, U. S. Department of Agriculture.

The neutron should be considered as a new chemical element of atomic number zero called "neuton," it was suggested by Dr. W. D. Harkins, University of Chicago.

The magneto-optic method used by Dr. Fred Allison, Alabama Polytechnic Institute, in the discovery of two new chemical elements was reported by Drs. B. S. Hopkins and Gordon Hughes, University of Illinois, to be "one-thousand times more sensitive than the most delicate methods of analysis now used," but unreliable when used by untrained workers.

A new copper isotope of atomic weight less than 63 was found by the magneto-optic method by Prof. Edna R. Bishop, Alabama Experiment Station.

A chemical not yet isolated in crystalline form seems to make possible the growth of yeast, reported Dr. Roger J. Williams, University of Oregon.

Silica black, intensely black mixture of coal and silica, was produced by Prof. C. A. Jacobson, University of West Virginia.

Krypton was forced to combine with chlorine, in its first known chemical union, at the Chemical Institute at Bonn.

A chemical formula for growth-promoting vitamin A was found by Prof. Paul Karrer, Chemical Institute, University of Zürich, who showed it to be closely related to artificial violet perfume.

Growth-promoting vitamin A was isolated by Prof. J. C. Drummond, University of London, and associates, by splitting carotene.

Vitamin A was produced from carotene, yellow plant pigment, by ultra-violet irradiation, reported Drs. F. P. Bowden and C. P. Snow of Cambridge. This finding was disputed by Prof. I. M. Heilbron and Dr. R. A. Morton of the University of Liverpool on the ground that action of ultraviolet light on carotene could only yield hydrocarbons, while vitamin A contains, in addition, oxygen in the form of an "alcoliol" group.

Vitamin G consists of two different chemical factors working together, it was indicated by the research of Prof. H. C. Sherman of Columbia University and Hazel Stiebeling, now at U. S. Bureau of Home Economics.

BLOOD WARMS

Dr. Benedict, shown holding a live eight-foot python, found that the snake, though cold-blooded, becomes almost warm-blooded when incubating her eggs

Isolation of the antineuritic vitamin B was reported by Prof. Adolf Windaus, University of Göttingen, Germany, who gave its formula as $C_{12}H_{17}N_3OS$.

Identity of newly-discovered hexuronic acid of adrenal gland origin and scurvy-preventing vitamin C was reported by Drs. J. L. Svirbely and A. Szent-Györgyi of University Szeged, Hungary, and Drs. C. G. King and W. A. Waugh of the University of Pittsburgh, who obtained the vitamin as crystals.

Drs. Otto Rygh, Aagot Rygh and Per Laland of Oslo reported that vitatin C is derived from narcotine, non-narcotic poison of opium, but the English biochemist, Dr. Silsa, disputed this finding.

A color photographic process using two negatives exposed in conventional camera and two "gaslight" prints cemented together was developed by Frederic E. Ives, of Philadelphia.

The National Research Laboratories were opened at Ottawa, Canada, with auditorium, exhibition halls and space for divisions of physics and engineering, chemistry, biology and agriculture, and research information.

The complete chemical structure of rotenone, one of the active principles of South American fish poisons, was discovered by F. B. La Forge, H. L. Haller and L. E. Smith, U. S. Department of Agriculture.

A method of electroplating with tungsten was patented by Dr. Colin G. Fink of Columbia University.

Two petroleum refining plants applying the hydrogenation process for the first time in this country were put in operation and licensing arrangements were made with fifteen refiners to use hydrogenation patents.

(*Turn to Page* 406)

STATISTICS

Chance of Death From Tuberculosis Figured

FOR A WHITE male child born in the United States in 1930 the chances of dying of tuberculosis are 42.5 in 1,000. But for white boys born in 1925 the chances were 50.9 per 1,000 of dying of this disease, while those born in 1920 had 64.6 chances per 1,000 of eventual death from tuberculosis.

"This means that, out of every thousand white males born at the present time, twenty-two escape the death of tuberculosis to which they would have been fated under conditions prevailing ten years ago," statisticians of the Metropolitan Life Insurance Company, who computed the chances, explain.

White girl babies born in 1920 had 57.7 chances per 1,000 of dying of tuberculosis, while those born in 1930 had 35.6 chances per 1,000.

Negro boys born in 1930 had 96.7 chances per 1,000 of dying of tuberculosis. Negro girls born in that year had 91.3 chances per 1,000 of death from this disease.

Science News Letter, December 24, 1932

PSYCHOLOGY

Flash in Eyes Produces Strange Color Effects

KEEP WELL AWAY from flashlight photographers.

This advice would be given by Dr. K. Mackenzie, who was the victim of a sudden, unexpected flash, which took place just below his head, close enough to singe his eyebrows. He describes in the British scientific journal, *Nature*, his visual experiences after the flash.

The first effect was a complete "blackout," lasting for an indefinite period. Next Dr. Mackenzie could see the filament of a 100 watt gas-filled lamp about three feet away from him. It appeared as a bright red line. Then, being a scientist, he turned to his watch and started to observe himself.

After twenty seconds more he could distinguish the general outline of the furniture. It appeared as a red monochrome. In about fifteen seconds the color changed from deep maroon to light claret, and in about ten more seconds to orange.

Then the background and some white objects changed suddenly to green, at first olive, afterwards brightening to emerald. The green faded rapidly, and after a slight intermediate yellow tinge white shades appeared for the first time.

The total illumination seemed, says Dr. Mackenzie, to increase steadily over the whole period. His pupils were still abnormally contracted at least two minutes after the flash took place, and owing to nervous reaction he is unable to state whether further after-images or color changes occurred.

Dr. Mackenzie's explanation of this experience is that the flash had reached its maximum intensity before either his pupil reflex or his eyelid reflex could operate. The eye was thus exposed to a very powerful beam of strongly actinic light. The peculiarity of the phenomenon was, he points out, that color sensation was regained discontinuously, and not in the spectral order that might have been expected.

Science News Letter, December 24, 1932

METEOROLOGY

Yellowstone Lake Has Huge Ice Output

YELLOWSTONE National Park has a superlative automatic ice-making plant, according to Park Ranger Allyn F. Hanks.

It is Yellowstone Lake, located at an altitude of 7,731 feet, which, during the winter months, would yield approximately 184,267,652.2 tons of ice at one cutting or about one and one-half tons for every man, woman, and child in the United States.

Ranger Hanks is in charge of the Lake district of the park, and last winter spent several months in this isolated section, 55 miles from the nearest railroad. "Night after night, with the thermometer hovering far below the zero mark and the snow piled several feet high in all directions," he explained, "one's mind turns to strange things, and I thought of the tremendous amount of ice contained in this large body of water which lay outside the door of the ranger station."

According to his figures, the average thickness of the ice on the Lake was estimated at 20 inches. With its area of 139 square miles and the weight of the ice figured at 57.2 pounds to the cubic foot, the total of over 184,000,000 tons of ice as the output of one cutting was estimated.

Science News Letter, December 24, 1932

IN SCIEN

PUBLIC HEALTH

Influenza Spread Increases Apprehension

SURGEON General Hugh S. Cumming, U. S. Public Health Service, is apprehensive regarding the increase in influenza cases throughout the country. A total of 26,144 cases were reported by state health officers for the week ending December 10. This is nearly double the number reported for the preceding week, while for the corresponding week of 1931 only 1,009 cases were reported.

The actual number of cases of influenza in the country is undoubtedly much higher than the reported number. Probably only one case out of every ten gets reported, Surgeon General Cumming pointed out. This is particularly apt to be the case at present when many people for financial reasons will not call a doctor for a mild case of influenza. The outbreak this year started on the West Coast, where the disastrous epidemic of 1917-1918 started, Surgeon General Cumming further pointed out.

Fortunately, the disease in the present outbreak has so far occurred in comparatively mild form and there has not been much pneumonia. Reports from western states showed decreases in the amount of influenza, indicating that the peak of the epidemic has probably been passed in that part of the country.

Science News Letter, December 24, 1932

PHYSICS

Scientists' Eyes Saved by Standard Lantern Slides

SCIENTISTS and engineers who sit through long scientific meetings will welcome the latest standardization project of the American Standards Association. Rules for widths of lines, lettering and symbols on lantern slide charts have been formulated and when put in practice are expected to reduce the number of illegible lantern slides shown at meetings.

Science News Letter, December 24, 1932

ENE FIELDS

ANTHROPOLOGY

Another Neandertaler Found in Palestine

DISCOVERY of a complete adult Neandertal skeleton in the Cave of the Oven, at the foot of Mount Carmel in Palestine, is reported by cable by Miss Dorothy Garrod, British archaeologist, to Dr. George Grant MacCurdy of Yale University.

Dr. MacCurdy is director of the School of Prehistoric Research which is exploring for remains of ancient man jointly with the British School of Archaeology.

The newly found skeleton lay in the same cave which yielded the massive lower jaw of a man several weeks ago. Near the Cave of the Oven is the Cave of the Kids, where Dr. Theodore D. McCown found eight skeletons of Neandertalers last spring. In 1931, an additional skeleton was found, so that altogether anthropologists have eleven individuals of this remote Palestine cave-dwelling age to study and compare.

Science News Letter, December 24, 1932

ENGINEERING

Radium Discovers Flaws In Ten-Inch Steel

USING a diminutive capsule of radium salt instead of an elaborate X-ray camera, engineers now take pictures through steel as much as ten inches thick in search of threatening cracks and flaws. With this recently developed technique, castings for big guns of the U. S. Navy are made to reveal their weakness before they can be fired disastrously, and electric welds are tested without actually breaking the joints.

These are some of the applications of testing with gamma rays of radium described by Dr. Gilbert E. Doan of Lehigh University. Dr. Doan was active in research which developed these methods.

X-rays have been used for some time in industrial testing, he pointed out. But the X-ray method is satisfactory only for relatively thin metal, and requires extensive apparatus, high-voltage electric current and trained operators.

"If the steel object were more than three inches thick it took so long for the X-rays to blacken the film that the process was hopelessly slow and costly," Dr. Doan said.

Now, since scientists have learned how to use gamma rays, they can test thicker castings more rapidly and with much less trouble, he explained. All that is required is a capsule of radium salt the size of a pea, and ordinary photographic paper.

The radium is put a short distance from the metal on one side and the photographic film, wrapped in black paper, is laid against the other side of the test specimen. The time of exposure depends on the thickness of the casting, a few minutes being sufficient in most cases. The developed film reveals the interior of the metal just as an X-ray of one's teeth gives the location of an abscess.

Science News Letter, December 24, 1932

METEOROLOGY

Winter Begins With Two Freakish Turns

THE FIRST two weeks of the weatherman's winter brought the United States two freaks of weather, one so unusual that "the records will have to be searched a long ways back to find a precedent," J. B. Kincer, chief of the Climate and Crop Weather Division of the U. S. Weather Bureau, told Science Service.

The first abnormality was an excessive drop from average temperatures for the first winter week (the weatherman begins winter Dec. 1) to those for the second week. This change was felt throughout the central, northwestern and more western portions of the country and in some places was as great as fifty degrees Fahrenheit. Livestock in this region suffered.

The cold weather brought snow with it, so that practically all the country that is ordinarily visited by snowfall was blanketed at the same time. This extensive coverage is very unusual so early in the season, Mr. Kincer said. The fall was moderate, but it covered all states except the larger part of the South and the Pacific coast for a short distance inland.

Science News Letter, December 24, 1932

ARCHAEOLOGY

Scientists Plan to Learn Prehistory of Southeast

THE LOST STORY of what happened in Southeastern United States in the days before Columbus can be reconstructed, in the opinion of Matthew W. Stirling, chief of the Bureau of American Ethnology, who spoke at the conference on southern prehistory held in Birmingham. Half a hundred American prehistorians attended the conference, which was organized by the Division of Anthropology and Psychology of the National Research Council, to plan the hard task of writing the prehistory of the Southeastern United States.

Mr. Stirling pointed out that not long ago the ancient story of the American Southwest was as confusing as the story of the Southeast seems today. Science had a mass of unrelated facts about Pueblo Indians and Basket Maker Indians, gathered from excavating Southwestern ruins and from studying modern tribes and the writings of Spanish explorers. Today, through systematized research, the story of the Southwest is told in amazing detail—amazing considering that the Indians themselves left no writings—from a time before the Christian era down to the era of Spanish conquest.

Mr. Stirling declared that it is especially important that science gather all possible knowledge of the Indians who lived in the southern states in the days of the explorers and in more recent times. Information about these Indians whom the white man has met and known is especially valuable in interpreting the remains of the prehistoric Americans.

Science News Letter, December 24, 1932

SEISMOLOGY

Earthquake Shakes Peruvian Andes

THE HIGH ANDES of Peru, north of Lake Titicaca, were shaken by an earthquake early Friday morning, Dec. 9, according to calculations by scientists of the U. S. Coast and Geodetic Survey, based on data gathered by telegraph and radio by Science Service. The calculations showed the quake as centering in 14.5 degrees south latitude, 71 degrees west longitude. Time of origin was 3:35 a. m., eastern standard time.

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White paper was made experimentally from southern pine, now universally used to produce brown kraft paper.

A machine for making gas from anthracite was developed by the Anthracite Institute.

S-D-O, synthetic drying oil, relative of synthetic "rubber," constituent of acid- and water-resistant paints, was developed by E. I. du Pont de Nemours and Company.

Cellulose has a molecular weight of 30,000, Prof. W. N. Haworth, Birmingham University, England, reported.

New rubber-like products were made from compounds similar to chloroprene by W. H. Carothers of the DuPont laboratories, who had reported that he made from chloroprene an artificial rubber superior in many respects to the natural substance.

Engineering

The Normandie, the world's largest ship, 75,000 tons, 1,020 feet long and with a beam of 117 feet, was launched at St. Nazaire, France.

A three-mile, high-level viaduct, longest in the world, across the New Jersey meadows and the Hackensack and Passaic rivers, was completed.

Work on Hoover Dam project has been sped almost a year ahead of schedule by the rapid completion of four diversion tunnels and two cofferdams.

The main dyke, 18½ miles long, closing off the Zuider Zee from the North Sea was completed in a project that will add more than half a million acres to Dutch farming land and reduce the Zuider Zee to a fresh water lake one-fourth its original size.

A new definition of the inch, 25.4 millimeters instead of 25.40005 millimeters, was adopted by the American Standards Association and industries of the United States.

The Conte Di Savoia, first gyro-stabilized passenger liner to cross the ocean, made her maiden voyage.

The development of air conditioning apparatus to control the temperature, humidity, purity and movement of atmosphere in the home, office and factory progressed.

Reclamation of about 200,000 acres of Pontine marshes, near Rome, neared completion so that farmers began to occupy fertile land which had been abandoned to the malarial mosquito for 2,500 years.

Ninety-mile-an-hour, light-weight electric cars and flange-wheeled, rubber-tired railbuses were put into operation.

The world's largest diesel engine, 22,500 brake horsepower, was built for a Copenhagen power station.

Two 20,000-kilowatt power plants using mercury vapor instead of steam neared completion at Kearny, N. J., and Schenectady, N. Y.

The largest radio tube ever constructed, made of iron and steel and having an input of 500 kilowatts, was built in the laboratories of the Metropolitan-Vickers Co., Manchester, England.

Blowing chunks of ore to pieces with steam, like cereal grains being made into breakfast food, was accomplished at the U. S. Bureau of Mines.

Dneprostroy, a large power plant, was put into operation at Kichkas on the Dnieper River, U.S.S.R.

Ten-million-volt artificial lightning was produced with a new generator in the Lynn, Mass., General Electric Laboratories.

A huge commercial explosion in Michigan, setting off 430,000 pounds of dynamite and similar explosives and bringing down more than 1,250,000 tons of quarry limestone permitted seismological observations of the structure of the earth's crust.

Experimental metal residences were built.

The Diesel engine was improved as a marine, airplane and stationary power plant and further invaded the automotive field.

The world's largest multi-pressure-boilered locomotive using steam at 850 pounds per square inch began operation on the Canadian Pacific.

Anti-knock fuel oils were developed for Diesel engines.

A surface treatment for nails was developed which increases their resistance to withdrawal from two to three times.

The transportation of loaded freight cars in specially built vessels in and out of New York, Havana and New Orleans was inaugurated to reduce handling costs at the ports.

Geology and Geography

A landslide engulfed part of Lyon, France, last spring.

Two parties to explore Mt. Everest, one on land and the other from the air, were planned by British scientists.

A descent of 2,200 feet below the surface of the sea was made by Dr. William Beebe, New York Zoological Society, to study deep-sea life.

An expedition on the submarine S-48 directed by Dr. Richard M. Field, Princeton, and Dr. F. A. Vening Meinesz, University of Utrecht and Netherlands Geodetic Commission, cruised 4,000 miles collecting geologic data bearing on earthquake causes.

Several submarine canyons, the deepest comparable with the Grand Canyon of the Colorado, were found by the U. S. Coast and Geodetic Survey off the New England Coast.

The Yale North India Expedition mapped more than 4,600 square miles in the Himalayas, hitherto unexplored.

The feat of sailing around Franz Josef Land in the North Polar Regions was achieved by Russian explorers.

Existing maps of the eastern shore of Hudson Bay show it as much as 25 miles away from its true location, Dr. Noel J. Ogilvie, director of the Geodetic Survey of Canada, discovered.

The Carpe-Koven expedition, which ascended Mt. McKinley in May to take measurements of cosmic rays, met with disaster, resulting in the death of both leaders.

Analysis of rock from Manitoba changed the estimated age of the earth to more than 1800 million years, Prof. Arthur Holmes, Durham University, reported.

A rich deposit of sulfur was found in California.

More than a ton of fossils were found in the Big Badlands of South Dakota by the Scott Fund Expedition of Princeton.

Teeth and bone fragments of a woolly mammoth were found near Philadelphia.

The well-developed finger-like tip of an ancient woolly mammoth's trunk was presented to the Leningrad Academy of Sciences.

Volcanic eruptions began in the Southern Andes, South America, on April (*Turn Page*)

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Philadelphia, Pa., U.S.A.

LEVIATHAN OUTSTRIPPED

The Normandie, world's largest ocean liner, was launched in 1932. It is expected that she will be completed for French transatlantic service in 1934

10, throwing dust into the atmosphere which caused red skies and sunsets in the southern but not the northern hemisphere.

Seismological reports of 37 earthquakes were collected and epicenters located by Science Service in cooperation with the U. S. Coast and Geodetic Survey and the Jesuit Seismological Association; these included five very destructive ones in populated regions of Cuba, San Salvador, Mexico, and Greece.

The Bagnold Expedition to the Libyan Desert traversed more than 1,200 miles, mostly unexplored country, studying the geological and biological features, and collecting implements of the paleolithic men who inhabited this now deserted region.

The second polar year began on October 1, and parties from many nations cooperated in gathering weather, magnetic and other data from the arctic and antarctic regions.

The summit of Mount Washington is occupied during the winter by a scientific party for the first time since 1887.

The Belgian scientific mission to the Ruwenzori mountains led by Compte Xavier de Grunne, explored the western slopes and succeeded in scaling several previously unclimbed African peaks.

The Haardt-Citroen Trans-Asia Expedition arrived in Peking at the end of a 5,000-mile exploration journey which began in Beyrouth, Syria, April, 1931.

A 60-foot memorial to Admiral Robert Peary, discoverer of the North Pole, was built on the northwest coast of Greenland, 600 miles north of the Arctic Circle.

Medicine

A complex sugar contained in the cell capsule surrounding the pneumonia germ plays a leading part in the germ's disease-producing activities, research by Dr. Oswald T. Avery, Rockefeller Institute for Medical Research, indicated.

A toxoid injection which will build up resistance to scarlet fever, and also a concentrated and purified toxin for use in preparing the toxoid, were developed by the U. S. Public Health Service.

Immunity to yellow fever is made possible by a new method making use of mouse serum, reported Drs. T. P. Hughes and W. A. Sawyer, of the Rockefeller Foundation, New York City, who have also devised a test for the effectiveness of the protection.

A new pain-relieving drug five times as potent as morphine but without the latter's habit-forming quality was called to the attention of the medical profession by Dr. Walter C. Alvarez of the Mayo Clinic.

A second respiration ferment was found by Dr. Otto Warburg and Dr. Walter Christian of the Kaiser Wilhelm Institute for Biology, Berlin.

Experimental evidence that virus diseases of plants and animals are caused by a non-living chemical substance analogous to enzymes was reported by Dr. Carl G. Vinson of the University of Missouri.

Lead poisoning may be detected by X-rays of the bones, Dr. Edward C. Vogt of the Infant's and Children's Hospitals, Boston, reported.

One type of deafness known as otosclerosis was found to be inherited as a sex-linked characteristic, Dr. Charles B. Davenport, Carnegie Institution of Washington, Cold Spring Harbor, Long Island, reported.

A plug inserted in the round window in the middle ear increases the hearing considerably, Dr. Walter Hughson and Dr. S. J. Crowe, Otological Research Laboratory, Johns Hopkins, found in experiments with cats.

Satisfactory results from a new sex gland treatment for "bleeders," were reported by Dr. Carroll L. Birch of the University of Illinois College of Medicine.

The common cold lasts only three or four days and gives immunity for three months, longer illnesses being due to secondary infections, Dr. Wilson G. Smillie, Harvard, reported.

Treatment with bacteriophage can reduce the deathrate from an ordinarily fatal type of blood-poisoning, it was reported by Dr. W. J. MacNeal and Dr. Frances C. Frisbee, New York Post-Graduate Medical School and Hospital.

Inhaling carbon dioxide relieves whooping cough, Prof. Yandell Henderson of Yale reported.

X-rays owe their effectiveness in cancer treatment to a speeding up of the lives of the cells, Dr. Raphael Isaacs, University of Michigan, reported.

Vaccine promising to give immunity to endemic typhus fever was developed by Drs. R. E. Dyer, W. G. Workman, A. Rumreich and L. F. Badger, U. S. National Institute of Health.

That lack of phosphorus and vitamin D in the diet is the chief cause of dental decay was reported by Dr. R. Gordon Agnew of West China Union University, whose results bear out those reported last year by Dr. E. V. McCollum and associates of Johns Hopkins University.

A new method of diagnosing diseases of liver and spleen by injecting thorium dioxide which gives clear X-ray pictures of these organs was reported by Drs. Wallace M. Yater and Lawrence S. Otell of Georgetown University.

Faulty structure of the brain cells, which allows potassium to escape or other substances to enter when the body fluids are diluted by too much water, may be the cause of epilepsy, research of Dr. Irvine McQuarrie, University of Minnesota School of Medicine, indicated.

Sleep in man and hibernation in other animals are controlled by iodine compounds in the circulation, Dr. G. S. Carter, British scientist, reported.

Mucin was found helpful in the treatment of stomach ulcer by Dr. Arthur J. Atkinson, Northwestern University Medical School.

Ten-mile altitudes will not kill flyers if the nitrogen of their bodies is first expelled, Sir Leonard Hill, British physiologist, concluded from animal experiments.

Discovery in the kidney secretion of the expectant mother of a new hormone that shows sex of unborn child was reported by Dr. John H. Dorn, University of California, and Edward I. Sugarman, Sugarman Laboratory, San Francisco.

Discovery that murrina, fatal horse disease, is transmitted by the vampire bat, marking third instance of a mammal being a disease vector, was reported by Dr. H. C. Clark, director of the Panama laboratories of the Gorgas Memorial Institute where the discovery was made.

Discovery of a difference between cancer and normal cells, that when multiplication is prevented, the cancer cell alone fails to change structure, was reported by Dr. Z. Zakrzewski, Institute of Pathology, Kracow, Poland.

Cancer may be due to changes in the centrosomes, is the theory of Mrs. Margaret Reed Lewis and Dr. Warren H. Lewis, Carnegie Institution of Washington and Johns Hopkins.

A new male sex hormone which affects pituitary and adrenal glands was reported by Dr. D. Roy McCullagh, Cleveland Clinic Foundation.

Infantile paralysis is contracted from a germ or virus entering through the membranes of the nose and passing along the nerves of smell to the brain and spinal cord, it was concluded by Dr. Simon (*Turn Page*)

DISEASE CARRIER

The vampire bat, pictured above, was reported to be the carrier of murrina, fatal horse disease

Flexner, director of the Rockefeller Institute for Medical Research.

The infantile paralysis germ enters the nervous system directly through the nose, reported Dr. Harold K. Faber, of Stanford University Medical School.

Infantile paralysis occurs repeatedly in the same families, indicating a possibly hereditary factor, reported Dr. W. Lloyd Aycock of Boston.

The germ of typhus fever and of spotted fever, though much alike, grow in different parts of the cells they invade, Dr. Henry Pinkerton of Peter Bent Brigham Hospital, Boston, and Dr. G. M. Hass of Children's Hospital, Boston, reported.

Successful treatment with X-rays of the usually fatal Hodgkin's disease was reported by Dr. A. U. Desjardins, of the Mayo Clinic.

Mosquitoes may carry tularemia, scientists of the U. S. Public Health Service found.

Dyes destroy the activity of the virus which produces a chicken tumor resembling cancer, reported Dr. Margaret Reed Lewis and Warren Reed Lewis, her son, Carnegie Institution Department of Embryology, Baltimore.

Ultraviolet radiation within the body was produced by injecting organic solutions excited by X-rays, reported Dr. Ellice McDonald and associates at the University of Pennsylvania.

An ionization chamber, which may be used to measure dosage of radium actually reaching bodily organs, was reported by Dr. Louis Mallet, Tenon Hospital, Paris.

Prolactin, a third anterior-pituitary gland extract, was isolated and found to produce milk secretion even in male animals by a group at the department of genetics, Carnegie Institution of Washington.

Radiations from parts of the human body powerful enough to kill yeast were reported by Prof. Otto Rahn, Cornell University.

Soricin, derived from castor oil, was found to make harmless the poison of snake venom as well as the intestinal toxins producing auto-intoxication, by Dr. Theodore H. Rider of the William S. Merrell Company.

Physics

The neutron, a combination of electron and proton having no electrical charge, was experimentally demonstrated by Prof. James Chadwick, of Cambridge, England.

Beryllium was bombarded with alpha particles (helium nuclei) by Prof. W. Bothe, German physicist, and a radiation obtained which was first thought to be super-gamma rays but later thought to be neutrons given off with the formation of carbon 12.

Confirmation of the existence of the neutron was obtained through the bombardment of lithium with alpha particles by Mme. Irene Curie-Joliot, and her husband, Dr. F. Joliot, at the Radium Institute, Paris.

The existence of a positive particle of matter having the mass of an electron was suggested by experiments of Dr. Carl D. Anderson, California Institute of Technology.

Radium disintegration is caused by the bursting of neutrons in unstable atomic nuclei made up entirely of protons and neutrons, according to a theory proposed by Prof. Werner Heisenberg, German physicist.

Oxygen was artificially disintegrated by bombardment with neutrons at the Cavendish Laboratory, Cambridge, England.

A new type of atomic disintegration was disclosed by Drs. J. D. Cockcroft and E. T. S. Walton of Cambridge, England, who bombarded lithium with protons accelerated at 600 volts, and released two alpha particles of eight million volts energy each.

CATCHING THE CRACKS

This picture was taken so fast that it photographed the electric bulb after the glass cracked but before it fell apart— a development at the Massachusetts Institute of Technology

A million-volt X-ray tube was put into regular operation at the California Institute of Technology.

Research on the atomic nucleus progressed through the use of electron streams in a manner analogous to the use of X-rays in revealing outer atomic structure.

Extensive and intensive researches on cosmic rays were conducted by a large number of physicists in all parts of the world.

A world survey of cosmic rays was directed by Dr. A. H. Compton of the University of Chicago and participated in by some sixty scientists in nine expeditions.

Cosmic rays depend upon the earth's magnetic field, being stronger near the magnetic poles than at the equator, according to Dr. A. H. Compton's world survey results which he interprets as strong evidence that cosmic rays are streams of electrified particles such as electrons or protons.

Cosmic rays are absorbed largely by the atomic nucleus, disintegrate it, and eject from it both positive and negative electrons with energies the great majority of which lie between 50,000,000 and 100,000,000 volts, it was found through use of a vertical Wilson cloud chamber in a very powerful magnetic field by Dr. Carl D. Anderson, working with Dr. R. A. Millikan at the California Institute of Technology.

Cosmic rays are more frequent from the magnetic north and south than from the east and west and are positively charged electrical particles, experiments by Dr. T. H. Johnson and Dr. J. C. Street of the Franklin Institute indicated.

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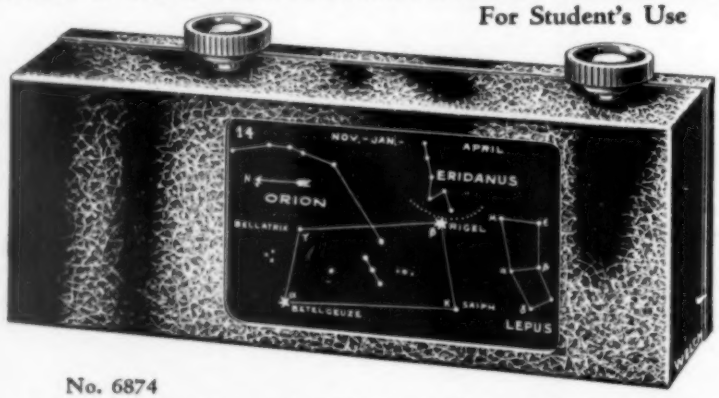

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Evidence that cosmic rays are photons or super-gamma rays was found by Drs. Carl D. Anderson and R. A. Millikan, California Institute of Technology, in the origin of electron tracks in a lead block without an ionizing ray entering.

Cosmic rays have energy of 40,000 million volts, Dr. Thomas H. Johnson, Franklin Institute, estimated.

Cosmic rays may originate when magnetic poles combine to form the neutron, Dr. R. M. Langer, California Institute of Technology, theorized.

A mathematical explanation of the relative lack of intensity of cosmic rays near the equator through attraction of the particles toward the magnetic poles was offered by Prof. Georges Lemaitre, University of Louvain, and Dr. M. S. Vallarta of Massachusetts Institute of Technology.

Cosmic rays were found to increase in intensity at high altitudes, but decrease in penetrating ability, as a result of airplane flights by Dr. L. M. Mott-Smith, Rice Institute, in cooperation with the U. S. Air Corps.

A second ascent into the stratosphere was made by Prof. Auguste Piccard, who found no constant increase of cosmic radiation with altitude

Argon gas under pressure increases the sensitivity of a cosmic ray ionization chamber, Drs. A. H. Compton and J. J. Hopfield, University of Chicago found.

A sensitive automatic recording electroscope for cosmic rays which makes a permanent record was developed by Dr R. A. Millikan and Dr. H. Victor Neher, California Institute of Technology.

Liquid helium, the world's coldest liquid, was photographed for the first time by Prof. J. C. McLennan and associates of the University of Toronto.

A new low temperature of minus 272.3 degrees Centigrade was attained by Prof. W. H. Keesom, Leiden University, by producing a high vacuum over constantly stirred liquid helium.

A new low temperature laboratory was built at the California Institute of Technology.

A vacuum tube sensitive enough to respond to an electric current of one quintillionth of an ampere was constructed by the General Electric Company.

Dr. Albert Einstein, influenced by evidence of receding nebulae accumulated at Mt. Wilson Observatory, jointly with the Dutch astronomer Prof. Willem de Sitter, revised the theory of curved space and suggested that space may be the sort of uncurved, three dimension space that Euclid imagined.

Dr. Albert Einstein extended his unification of the laws of gravitation and electricity to the interior of the electrons and protons.

That one magnetic pole can exist apart from another of opposite sign, was suggested by the British physicist, Dr. P. A. M. Dirac.

Velocity of light does not decrease with passage of time, independent experiments of Dr. Olin C. Wilson, Mt. Wilson Observatory, and Prof. Roy J. Kennedy at the California Institute of Technology indicate.

Discovery of three kinds of tides in the atmosphere, caused by gravitational forces of the sun and moon and daily heating and cooling of the air, was announced by Prof. J. Bartels, German research associate of the Carnegie Institution of Washington.

A super-centrifuge microscope in which

The Public's Way to Science

SCIENCE SERVICE is the unique institution established for the purpose of disseminating scientific information to the public. It acts as a liaison agency between scientific circles and the world at large. It interprets original research and reports the meetings of learned societies in a way to enlighten the layman. The specialist is likewise a layman in every science except his own and he, too, needs to have new things explained to him in non-technical language.

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DISCOVERIES

SCIENTIFIC progress is so rapid and revolutionary nowadays that no one can keep up with it without some means of keeping in close contact with its new ideas and discoveries. Science Service provides life-continuation courses in all the sciences for newspaper readers without tuition fees or entrance examinations.

cells and other objects may be observed whirling at bullet-like speeds, was developed through the cooperation of Prof. E. Newton Harvey, Princeton, co-inventor of the centrifuge microscope, and Dr. J. W. Beams and A. J. Weed, University of Virginia, inventors of the super-centrifuge.

A stroboscopic camera making exposures in 1/100,000 second was developed at Massachusetts Institute of Technology.

A new dye for sensitizing photographic plates, zenocyanine, for photography by infra-red light from 8,000 to beyond 11,000 Angstrom units, was developed at the Eastman Kodak Laboratories.

Artificial aurora was produced by Dr. Alexandre Dauvillier of Paris by bending slow electrons in an evacuated bulb.

A gravity balance so delicate that it detects the moon's attraction was invented by Dr. Kenneth Hartley, Houston, Texas.

Psychology and Psychiatry

Production through selective breeding of a race of super-intelligent rats and another of stupid animals, an original demonstration of the hereditary nature of intelligence, was reported by Dr. R. C. Tryon, University of California.

Superior ability to verbalize is what distinguishes the mentality of human infants from that of apes, Dr. Louis W. Gellermann reported.

Feeling and consciousness both take place at the base of the left half of the brain in righthanded persons, is the tentative conclusion reported by Dr. Louis B. Alford of St. Louis.

The auditory nerve does not respond to electric currents even when of the same form and frequency as sound waves, Dr. George Kreezer, Cornell, discovered in experiments with cats.

Loss of the entire vision centers of the brain still leaves the animal sensitive to light, Dr. Donald G. Marquis of Yale found.

The brain of the scholar has a better blood supply and composition than that of ordinary men, Dr. Henry H. Donaldson, Wistar Institute of Anatomy and Biology, reported.

When an animal receives a mild electric shock, it takes twice as long for the nervous impulse to reach his brain as it does for the same impulse to be translated into action, Dr. Alexander Forbes, Harvard Medical School, found.

The value of psychological tests in rehabilitation and placing of the unemployed was demonstrated in several large cities.

Study of 404 pairs of twins affected by mental disease showed that insanity tends to attack the twin of the patient if they are identical, but not if non-identical, reported Dr. A. J. Rosanoff of the University of Southern California.

The malaria treatment for paresis is unsuccessful with Negroes, Dr. Bruce Mayne, U. S. Public Health Service, reported.

Study of over 600 epileptics and their families led Dr. Calvert Stein of the Monson State Hospital, Palmer, Mass., to conclude that epilepsy is not an inherited disorder.

Acid or alkaline reaction of the body, on which some modern methods of treating epilepsy are based, is not as important a factor in the disease as the amount of fluid in the body, studies of Drs. Morgan B. Hodskins and Riley H. Guthrie of Monson State Hospital, Palmer, Mass., showed.

Chemical and psychological relation between epilepsy and certain endocrine glands, notably the pituitary and sex glands, was reported by Dr. Alfred Gordon of Philadelphia.

One-tenth of institutionalized cases of mental deficiency have their origin in birth injuries, Dr. Edgar A. Doll, Vineland Training School, stated.

Recognitions and Awards

The Nobel Prize in chemistry was awarded to Dr. Irving Langmuir, General Electric Research Laboratory.

The Nobel Prize in medicine was awarded to Sir Charles Scott Sherrington of Oxford and Prof. Edgar Douglas Adrian of Cambridge.

Dr. John J. Abel of Johns Hopkins was elected president of the American Association for the Advancement of Science.

The gold medal of the Royal Astronomical Society was awarded to an American, Dr. Robert Grant Aiken, director of the Lick Observatory of the University of California.

The $1,500 prize given by the American College of Physicians in memory of Dr. John Phillips was awarded to Dr. O. T. Avery for research on the pneumonia germ.

Willis H. Carrier, engineer, was awarded the first F. Paul Anderson gold medal.

Prof. James Bryant Conant, Harvard organic chemist, was given the William H. Nichols medal of the American Chemical Society's New York Section, and also the Chandler medal of Columbia University.

The Washington Award, administered by the Western Society of Engineers, was presented to Dr. William D. Coolidge of the General Electric research laboratory.

The Gold Medals of the Society of Arts and Sciences, New York City, were awarded to Dr. William Crocker, Boyce Thompson Institute of Plant Research, and to Dr. Harlow Shapley, Harvard College Observatory.

Dr. R. A. Daly, Harvard geologist, was awarded the Hayden Memorial Gold Medal by the Academy of Natural Sciences of Philadelphia.

The Guggenheim Gold Medal was awarded to Juan de la Cierva for development of the theory and practice of the autogyro.

The Remington Medal of the American Pharmaceutical Association was awarded to Eugene G. Eberle of Baltimore.

Giuseppe Faccioli was awarded the Lamme Medal of the American Institute of Electrical Engineers.

The Willard Gibbs Medal of the American Chemical Society was awarded to Dr. Edward Curtis Franklin, Leland Stanford University.

The Edison Medal of the American Institute of Electrical Engineers was awarded to Bancroft Gherardi, vice-president and chief engineer of the American Telephone and Telegraph Co.

The Copley Medal of the Royal Society of London was awarded to Dr. George E. Hale, director emeritus of Mt. Wilson Observatory, for work on the magnetic field of the sun.

The gold medal of the American Medical Association went to Drs. Frank A. Hartman, C. W. Greene, J. J. Maisel and G. W. Thorn, University of Buffalo, for their original work on the development and use of a hormone from the suprarenal cortex.

The medal of the American Institute of Chemists was given to Dr. Charles H. Herty, of New York.

The medal of honor of the Institute of Radio Engineers was awarded to Dr. A. E. Kennelly, co-discoverer of the Kennelly-Heaviside layer.

The $10,000 prize of the Popular Science Monthly was awarded to Dr. Irving Langmuir, associate director of the research laboratories of the General Electric Company.

Dr. Arthur A. Noyes of the California Institute of Technology was honored with the first award of a medal in commemoration of Theodore W. Richards, Harvard chemist.

The Perkin Medal of the American Section, Society of Chemical Industry was awarded to George Oenslager of Akron.

The Priestley Medal of the American Chemical Society was given Dr. Charles L. Parsons of Washington, D. C.

The John Fritz gold medals were awarded to Dr. Michael I. Pupin of Columbia University and Daniel Cowan Jackling of San Francisco.

The American Chemical Society's $1,000 prize in pure chemistry, awarded to chemists under 30, was given Dr. Oscar K. Rice of Harvard.

The National Academy of Sciences' Public Welfare Medal was given posthumously to Dr. Wickliffe Rose.

Dr. William L. Russell, Cornell, was selected to give the Thomas W. Salmon Memorial Lectures for 1933, by the New York Academy of Medicine.

The John Scott medal given by the city of Philadelphia was awarded to Dr. Joseph Slepian, consulting research engineer for Westinghouse Electric and Manufacturing Company.

For research in the course of which he watched for the first time the growth of nerves in the transparent tail of a living tadpole, Dr. Carl Caskey Speidel, of the University of Virginia, was awarded the annual $1,000 prize by the American Association for the Advancement of Science.

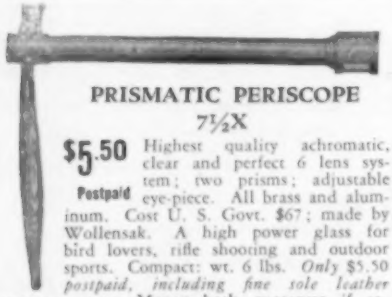
Franklin Medals of the Franklin Institute were awarded to Dr. Ambrose Swasey of Cleveland and to Dr. Philipp Lenard of Heidelberg.

Dr. Hugh S. Taylor, chemist, Princeton, elected Fellow of the Royal Society.

The Penrose Medal of the Geological Society of America was givn to Dr. E. O. Ulrich, U. S. Geological Survey.

The National Academy of Sciences' Mary Clark Thompson Medal was given to Dr. David White, Senior Geologist of the U. S. Geological Survey and a member of the Academy.

The Duddell Medal of the British Physical Society was awarded to Prof. C. T. R. Wilson.



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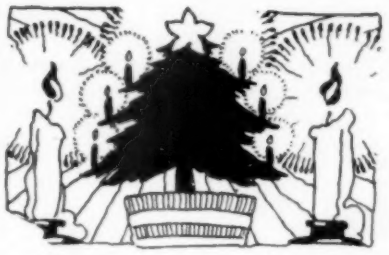
FORESTRY

NATURE RAMBLINGS

by Frank Thone



Permanent Christmas Trees

EVER SINCE we began to be excited over the conservation of our forests, a generation or so ago, the question of the Christmas tree has been the cause of much discussion. It has been denounced as a waste and a menace by the party of the extreme right, and defended stoutly by the adherents of the old tradition and by those who claim it has a legitimate place as a market outlet for little trees cleared out of growing forests to give the others a chance to grow normally.

One way out of the dilemma, and a way which many citizens are taking, is to buy a small spruce or fir potted in a tub, and use it as a permanent Christmas tree. A living tree has a good deal of advantage over a cut one that will soon be dead, even though the initial cost is greater. It is healthier, more alive-looking, and if it has been kept properly watered it does not shed its needles all over the place, as a cut tree does as soon as it begins to dry out. It is not squashed out flat from being shipped in a freight car, as cut Christmas trees are apt to be. It can be moved into the house and out again without the fuss and possible ruination to the floor involved in nailing up the ordinary tree. It comes to have the same emotional appeal that the family dog has, especially if you buy it "as a pup" and let it grow up with the children.

And when it is not on duty as a Christmas tree it can stand outdoors, either as a green sentinel alongside the front steps (better have a pair for this purpose) or pot-sunk in the ground as a part of the general planting. When it finally gets too big for indoor use, break the old tub away from the roots and set it permanently in the earth.

Science News Letter, December 24, 1932

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•First Glances at New Books

Paleontology

THE FELIDAE OF RANCHO LA BREA—John C. Merriam and Chester Stock—*Carnegie Institution,* xvi+231 p., 43 pl., paper $7, cloth $8. Man, the elephant, the whale, and other valuable animals are a long time coming to birth. For a number of years, paleontologists and students of the life sciences generally have known that Merriam and Stock were at work on a monograph of the cats of the famous California tar-pits, and they have possessed their souls in patience. Now their vigil is rewarded with a truly magnificent book, that adds solidly to the data of mammalian paleontology generally, and about the cats of this particular locality simply leaves nothing more to be said. While the treatment of the two big species *Smilodon californicus* and *Felis atrox,* is principally morphological, there is also much matter of interest to the palecologist; and the non-technical reader will get a genuine thrill from Knight's splendid restoration drawings of the greatest of the sabre-tooth cats and the huge Pleistocene lion.

Science News Letter, December 24, 1932

Geology

TREATISE ON SEDIMENTATION—William H. Twenhofel—*Williams and Wilkins,* xxix+926 p., $8. The success of this book, worked up under the auspices of the National Research Council, is so well attested that it has entered a second edition, in spite of the fact that its limited field gives it an appeal to only a limited audience. However, the thoroughness with which the various authors have written their respective sections, and the skill with which Dr. Twenhofel has assimilated their contributions to each other to make a harmonious whole, has made the book one of the geologist's few real indispensables. No one can pretend to handle the subject of sedimentation (the Siva of geology, which destroys and rebuilds in the same act) without recourse to this book.

Science News Letter, December 24, 1932

Genetics

RECENT ADVANCES IN PLANT GENETICS—F. W. Sansome and J. Philp—*Blakiston,* 414 p., $4. While there are many texts in elementary genetics, there has not been until now a comprehensive work in English on the newer developments in plant genetics. For this reason the present volume, by two well-known English workers, should be assured of a welcome by research men, teachers and advanced students interested in this special discipline.

Science News Letter, December 24, 1932

General Science

SCIENCE TODAY AND TOMORROW—Morley College Lectures—*Williams & Norgate, Ltd.,* 196 p., 8s. 6d. A concise, informative and extremely readable survey of the broad fields of science originally prepared in the form of lectures before the Morley College for Working Men and Women at London. Eminent British scientists, including Sir Frank Dyson, the Astronomer Royal, Professor G. Eliot Smith, etc., cover astronomy, psychology, chemistry and radiation, anthropology, medicine, biology, mechanism, botany and geology.

Science News Letter, December 24, 1932

Preventive Medicine

OUTLINE OF PREVENTIVE MEDICINE—Edited by Frederic E. Sondern, Charles Gordon Heyd and E. H. L. Corwin—*Hoeber,* 462 p., $5. This book is intended for medical practitioners and health officers, medical students and the intelligent layman. It has been prepared under the auspices of the committee on public health relations of the New York Academy of Medicine. This second edition has been enlarged considerably. The book aims to teach methods of preventing disease in the first place, and of preventing the more serious results of disease by suitable, early treatment. The sections are written by specialists in the various subjects.

Science News Letter, December 24, 1932

Chemistry

ON THE MECHANISM OF OXIDATION—Heinrich Wieland—*Yale Univ. Press,* 117 p., $2.50. Professor Wieland, of the University of Munich, received the Nobel Prize in chemistry in 1927. In this volume, based on the Silliman Lectures which he delivered at Yale University, Professor Wieland discusses his important researches in a field in which he is recognized as an authority.

Science News Letter, December 24, 1932

Physics-General Science

TIME, MATTER, AND VALUES—R. A. Millikan—*University of North Carolina Press,* 99 p., $1. In bringing into printed form the McNair lectures at the University of North Carolina Dr. Millikan explains that he attempts to give in very brief form some of the most significant changes in fundamental concepts which have resulted from the extraordinary advances made in recent years in the field of experimental physics. "These changes," he says, "obviously have important bearings not only on physics but on the whole outlook of mankind toward nature, and hence toward life. They show that the great blunder which the physics of the past had made has consisted in extending its generalizations which undue assurance into fields in which they have not been experimentally tested. . . . This has led in the past to a dogmatism in science which is at bottom indistinguishable from dogmatism in theology or in any other field. . . ."

Science News Letter, December 24, 1932

Metallurgy

THE METALS, THEIR ALLOYS, AMALGAMS AND COMPOUNDS—A. Frederick Collins—*Appleton,* 310 p., $2. A popular handbook intended for elementary reading. One chapter is devoted to the metals men believed to exist but later proved to be non-existent.

Science News Letter, December 24, 1932

Mathematics

NEW SOLID GEOMETRY — Fletcher Durrell and E. E. Arnold—*Charles E. Merrill Co.,* 531 p., $1.24. A new edition of a textbook for elementary courses.

Science News Letter, December 24, 1932

Preventive Medicine

ANNUAL REPORT, 1931—*Rockefeller Foundation,* 420 p., Free. The progress during 1931 of the varied activities carried on with the support of the Rockefeller Foundation is reported in this volume. Medical, social and natural sciences as well as public health and humanistic studies were aided.

Science News Letter, December 24, 1932

Science News Letter will secure for its subscribers any book or magazine in print, which was published in the United States. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the U. S. Address: Library, Science Service, 21st and Constitution Avenue, Washington, D. C.